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# Alternative Transportation for UW Tacoma

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The objective is to provide information and a prediction for UW Tacoma to see how alternative transportation will be like. The goal for this case study is to let colleges understand with the help of GIS tool, colleges can predict how their alternative transportation system will work.


## VANPOOL

This analysis is based on the following scenario: UW Tacoma provide vanpools for all students. Students who live outside 5 minutes drive from UW Tacoma are eligible to take the van home so that they can pick other students up along the way to school. Using "Create Service Area" tool from ArcGIS, it was determined that 340 students are living outside 5 minutes drive from UW Tacoma. By using KPNetwork created before, "Routing Problem Analysis" was performed. It will automatically calculate and determine the best way to allocate vans and pick up routes. Vans are set up with the following variables: 0.46 per mile distance cost, which is suggested by Transit Development Plan of Pierce Transit; maximum capacity of 15 in each van, and maximum time limit as 90 minutes.

Results:

The results from ArcGIS showed 1888 locations are available for pick up. 258 vans are needed to pick up 2472 students in 1888 locations. The total length travel by all vans is 4243.8 miles per trip, about 9000 miles for round trip per day. Total distance cost for one way trip is $1952 and about $4000 for round trip per day.

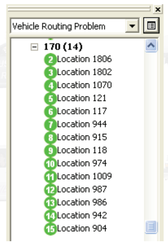
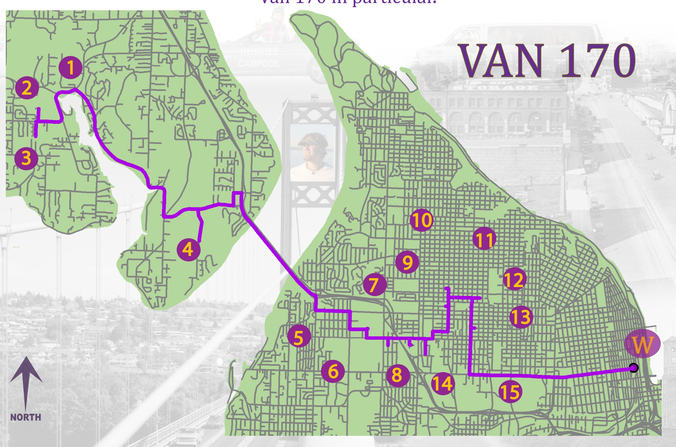



Fig.1 Vanpool Pickup Sequence is determined automatically by Network Analysis. It shows the stop sequence of Van 170

Fig.2 It shows the route and stop of 1 of the 258 vans. Van 170 in particular.



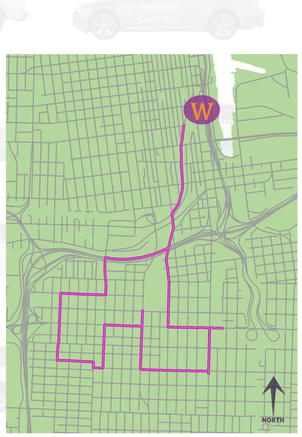


## TRANSIT

The scenario is UW Tacoma will provide transit service and will cover areas with its 2 miles radius. Existing bus stop locations are downloaded from WAGDA. By using "buffer" tool and "select by location", it is determined that 167 students are living with 2 miles from UW Tacoma. By using "closest facility analysis", ArcGIS determined 104 stops from existing Pierce Transit bus stops are needed. Requirement is the total time has to be within 30 minutes.

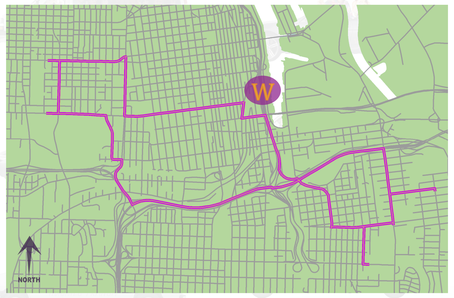
Results:

By using "Route Problem Analysis", 4 transit routes are needed. those 4 routes are created to go through all stops within 30 minutes. Each route service about 25 stops. Fig.3 showed the most efficient routes for UW Tacoma.



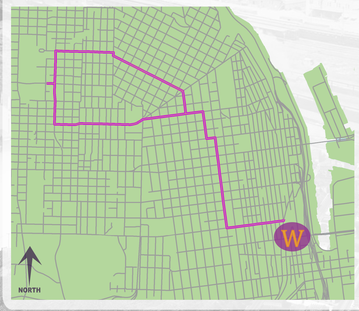

ROUTE B

Fig.3 It shows the route of the 4 transit routes that serve areas within 2 miles from UW Tacoma.




ROUTE C

ROUTE D




ROUTE A



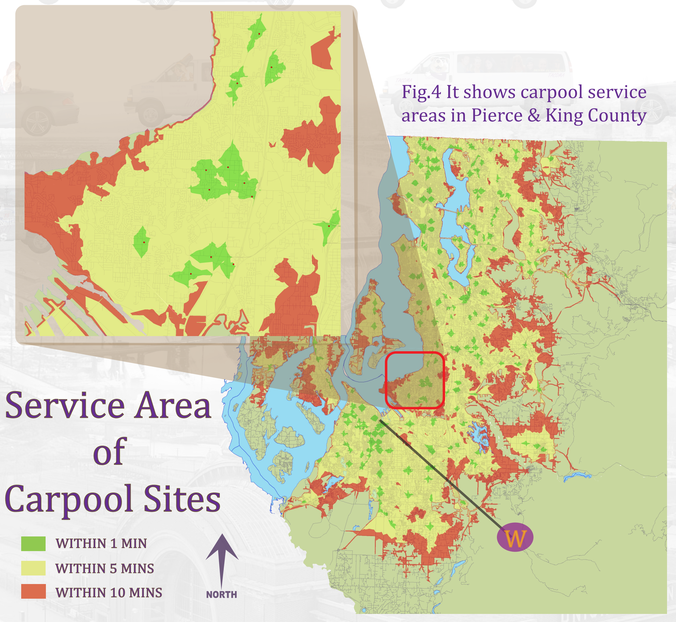
## CARPOOL

Given there are 2485 students who live within the boundaries of King and Pierce County. First, park and ride lots, and Pierce and King County parcel data that includes land use types were downloaded from WAGDA and King County Department of Assessments. Existing park and ride lots are then classified as a carpool site. Through multiple "select by attribute" and "export data", parcels that have the potential of being a carpool site were left. "Select by attribute" was then used again to eliminated parcels with names that are most likely not a parking lot. I then look at them one by one to to hand pick good carpool locations. In the end, 229 carpool sites are chosen. Next, network analysis was performed to identify the sites' service area. Road layers of Pierce and King County were downloaded from WAGDA and KPNetwork was created. By using "Create Service Area", ArcGIS was able to identify service areas within 1 , 5 and 10 minutes (fig.4).

Results:

"Select by location" was used to come up with the following results: 186 students are living within 1 minute drive to the closest carpool site, 1450 students are living between 1-5 minutes drive, 207 students are living between 5-10 minute drive.

Fig.4 It shows carpool service areas in Pierce & King County




Projection: NAD_1983_HARN_StatePlain_Washington_South_FIPS_4602_Feet
Data Sources: the Office of Institutional Research and Planning of UWT, Washington Sate Geospatial Data Archive (WAGDA), University Libraries of UW, King County Department of Assessments, Pierce Transit, Sound Transit, Dr. Matthew Kelly
Key Literatures: Litman, T. (1999). Reinventing Transportation. Transportation Research Record, 1670, 1-12. Litman, T. (2003). The Online TDM Encyclopedia: mobility management information gateway. Transport Policy, 10(3), 245-249. doi: 10.1016/S0967-070X(03)00025-8
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